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Czech commercial banks: are they liquid enough to finance loan commitments?

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Abstract

The aim of this paper is to find out if Czech commercial banks are liquid enough to meet sold loan commitments and if there are any significant differences depending on the size of the bank. We have used the scenario analysis for three liquidity ratios in the period from 2007 to 2012. The majority of Czech banks is able to finance the use of 50 % of loan commitments. The most vulnerable banks belong to the group of medium banks; they focus strongly on lending activity which they finance also from other sources of financing.

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Keywords: Loan commitments; bank liquidity; liquid assets; loan; deposits; scenario analysis; vulnerable bank

1. Introduction

Bank liquidity is very important for the whole economy. Bank which has sufficient liquidity can provide loans to customers. Loans provided to companies are very important source of their financing. In the Czech Republic, the average share of loans in total assets of industrial companies is about 12–18 %. In some industrial sectors,

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importance of bank loans is even higher (MPO, 2012). This is especially true for small and medium sized companies that cannot rely on other source of financing such as debt or equity securities issuance.

However, not only availability of loans for companies matters. Loans provided to households are also very important. Mortgage loans have a direct impact on the housing market and thus on a financial situation of building companies. Consumer loans influence the demand for products and services from various industrial sectors. This could result in higher sales of companies.

Banks are obliged to provide some loans, and so to the extent to which they issued loan commitments. However, if the bank is not liquid enough, it cannot to honor discretionary loan commitment. This would result in a bad reputation of such bank.

The aim of this paper is therefore to find out if Czech commercial banks are liquid enough to meet sold loan commitments and if there are any significant differences depending on the size of the bank.

The structure of the paper is following. Second section characterizes loan commitments, third section describes methodology and data, fourth section contains results of the scenario analysis and last section captures concluding remarks.

2. Loan commitments

Bank loan commitment is a contractual promise to lend to a specific borrower up to a certain amount at pre-specified terms. Loan commitments are beneficial for both banks and borrowers. Loan commitments offer following benefits to purchasers: (i) they improve risk sharing between bank and borrower; (ii) they help attenuate moral hazard; (iii) they help reduce other investment distortions (loan commitments address overinvestment, underinvestment, and suboptimal liquidation problems); (iv) they play informational role (loan commitment parameters can be designed to reveal a borrower's unobservable characteristics); and (v) they give borrowers a strategic advantage (for borrowers from industries with imperfect competition, the option to acquire financing at predetermined rates enhances the borrowers strategic position and creates value for the borrower. For banks, (i) loan commitments improve banks' forecast of future loan demand; and (ii) they help banks balance reputational and financial capital optimally (Ergungor, 2001).

Table 1. Loan commitments in the Czech banking sector.

	2007	2008	2009	2010	2011	2012
Loan commitments (billions of CZK)	626.20	609.40	505.70	506.80	491.10	456.30
Share of loan com. on total off-balance sheet assets (%)	6.49	5.65	7.29	7.99	7.33	6.73
Share of loan commitments on total banking assets (%)	16.70	15.07	12.35	12.10	10.97	9.66

As it can be seen from Table 1, although the total volume of provided loan commitments in the Czech Republic is decreasing (and their share on total banking assets as well), loan commitments are an important part of off-balance sheet transactions of Czech banks – their share on total off-balance sheet assets range around 7 %.

3. Methodology and data

To be able to finance issued loan commitments (and thus increase lending activity), each bank must have sufficient liquidity. Scenario analysis is one of the possible tools how to assess the ability of banks to meet their obligations. Therefore we will describe scenario analysis based on selected liquidity ratios in the first part of this section, and then we will focus on data used.

3.1. Liquidity ratios

Liquidity ratios are used for liquidity risk measurement and it is a stock-based approach. All items of the bank's balance sheet are divided into liquid assets, illiquid assets, stable liabilities and volatile liabilities. These categories are compared against each other in various ways. These ratios reflect the fact that bank should be sure that

appropriate, low-cost funding is available in a short time. Liquidity ratios can help to identify main liquidity trends (Vodová, 2013). Various authors provide various liquidity ratios. For the purpose of this paper, we will use following three liquidity ratios: share of liquid assets in total assets, share of loans in total assets and share of loans in deposits.

Share of liquid assets in total assets (LITA) shows which part of the total assets can be readily converted to cash. Therefore it should give us information about the general liquidity shock absorption capacity of a bank. As a general rule, the higher the share of liquid assets in total assets, the higher the capacity to absorb liquidity shock, given that market liquidity is the same for all banks in the sample. Nevertheless, high value of this ratio may be also interpreted as inefficiency. Since liquid assets yield lower income liquidity bears high opportunity costs for the bank. Therefore it is necessary to optimize the relation between liquidity and profitability. Equation (1) shows the principle of calculation of this ratio:

$$LITA = \frac{liquid\ \ assets}{total\ \ assets} * 100(\%) \tag{1}$$

where liquid assets consists from cash, balances with central bank, receivables from credit institutions payable on demand and bonds issues by central government and central banks.

The value of the share of loans in total assets (LOTA) indicates what percentage of the assets of the bank is tied up in illiquid loans. The interpretation is therefore opposite than in case of the previous indicator: the higher the value of this ratio, the less liquid the bank is. However, too low value of this ratio may indicate that the bank does not provide loans sufficiently. This could lower bank profitability. This ratio is calculated as follows (2):

$$LOTA = \frac{loans}{total\ \ assets} * 100(\%) \tag{2}$$

The last ratio – share of loans in deposits – relates illiquid assets (i.e. loans provided to nonbank clients) with liquid liabilities (i.e. deposits of nonbank customers). We can calculate it with the use of equation (3).

$$LODE = \frac{loans}{deposits} * 100(\%) \tag{3}$$

Its interpretation is the same as in case of the share of loans in total assets: the higher this ratio the less liquid the bank is. Lower values of this ratio means that loans provide by the bank are financed by deposits. This loan to deposit ratio also provides information which part of loans provided to non-bank clients is financed from clients' deposits. Values lower than 100 % mean that loans are fully financed from clients' deposits. Values higher than 100 % signal that bank needs also other source of funding such as interbank loans or funds from debt securities issuance. Although large proportions of clients' deposits are in the form of demand deposits, they are generally stable source of funding. In terms of liquidity risk, banks should prefer lower value of this ratio. High value indicates that the bank is more vulnerable, especially in case of market turbulence.

3.2. Scenario analysis based on liquidity ratios

Scenario analysis is a category of stress tests which are used to gauge potential vulnerability of financial institutions to exceptional, extreme or simply unexpected but plausible events (BIS, 2000). Stress tests for liquidity risk are used relatively short time. Liquidity stress test should identify and quantify the potential lack of liquidity for specific stress scenario and determine the way how to close this lack at predefined costs. Three types of stress scenarios are usually applied: idiosyncratic, market, and combination of both. The idiosyncratic scenario typically represents a simulation of an outflow of deposits or a decline in the rating of the bank. The market shock usually assumes the decline in the value of certain assets or disturbances in the money or credit markets. These two

scenarios are accompanied by other macroeconomic shocks, such as the decline in economic activity, growth of loans in default or deterioration of the sovereign rating (Komárková et al., 2012).

Several central banks and other supervisory authorities have applied stress tests of liquidity, e.g. in Netherland (Van den End, 2008), in the Czech Republic (Komárková et al., 2011), in Hong Kong (Wong and Hui, 2009) or in Romania (Negrila, 2010). However, their tests are not possible to repeat with publicly available information. From this reason, we will focus also on other less complex studies which measured the impact of selected scenario (or several different scenarios) on selected liquidity ratios in Austrian (Boss et al., 2004; Boss et al., 2007), Slovakian (Jurča and Rychtárik, 2006) or Luxembourg (Rychtárik, 2009) banking sector.

Among above cited studies, only two studies focused on the impact of the banks' capacity to provide the loans they have committed in previous periods. Rychtárik (2009) simulated a use of 50 % of loan commitments. Komárková et al. (2011) modeled a drawdown of committed credit lines amounting to only 10 %, but together with growth in the nominal stock of credit. Therefore, we can expect a higher increase in bank lending activity. However, as we do not have data about loan commitments for all banks in the sample, we will simulate a 5 % increase of loans provided to nonbank clients. We assume that this liquidity outflow is enough to cover use of loan commitments, larger bank overdrafts and greater use of credit cards by customers in case of any crisis period. Moreover, this 5 % increase of loans corresponds to 50 % of loan commitments for banks for which we have data about loan commitments.

To measure the impact of the use of loan commitments on bank liquidity, we will calculate stress values of the liquidity ratios for each bank in the sample. To calculate the stress values of each ratio, we simply increase loans by 5 % and decrease liquid assets by 5 % of loans (we assume that liquid assets are used for providing more loans). The volume of total assets and deposits does not change – equations (4), (5) and (6).

$$LITA_{SC} = \frac{liquid\ assets - 0.05 * loans}{total\ assets} * 100(\%) \tag{4}$$

$$LOTA_{SC} = \frac{1.05 * loans}{total\ assets} * 100(\%) \tag{5}$$

$$LODE_{SC} = \frac{1.05 * loans}{deposits} * 100(\%) \tag{6}$$

As a next step, we will compare these stress values to the baseline values of the ratios. The percentage change of the values of individual ratios for each bank in the sample and each ratio will be calculated according to the equation (7):

$$L_i = \frac{(L_{iS} - L_{iB})}{L_{iB}} * 100(\%) \tag{7}$$

where L_i is a bank/ratio specific figure i.e. the percentage change of the ratio for the bank and the scenario), L_{iS} is the stress value and L_{iB} is the baseline value of all ratios for all banks in the sample. Following the methodology of Rychtárik (2009), we will calculate the median values for all liquidity ratios and for all banks. The results will show the magnitude of the relative changes between the stress and baseline values which will enable us to find out the most vulnerable banks. In order to find out if there are any significant differences depending on the size of the bank, we will also calculate average values separately for individual group of banks (small, medium and large).

3.3. Data used

We used unconsolidated balance sheet data over the period from 2007 to 2012 which were obtained from annual reports of Czech banks. Table 2 shows more details about the sample.

Table 2. Data availability.

	2007	2008	2009	2010	2011	2012
Total number of banks	37	37	39	41	44	43
Number of banks in the sample	11	12	12	13	13	13
Share of observed banks on total banking assets (%)	70.35	67.78	69.60	70.29	72.57	70.37

In spite of the relatively small number of banks in the sample, the data set includes significant part of Czech banking sector (around 70 % of total assets of the banking sector). Due to the homogeneity of the data set, we include only data of commercial banks and we abstract from branches of foreign banks, mortgage banks, building societies and state banks with special purpose (such as Českomoravská záruční a rozvojová banka and Česká exportní banka). The detailed list of banks in the sample can be found in Appendix.

4. Results and discussion

The first part of this section shows the median values of the baseline and the stress values of chosen liquidity ratios. The second part of this section focuses on the differences among individual group of banks.

4.1. Baseline and stress values of liquidity ratios

The median values of the baseline and stress values of share of liquid assets in total assets (LITA), the share of loans in total assets (LOTA) and the share of loans in deposits (LODE) are presented in Fig. 1.

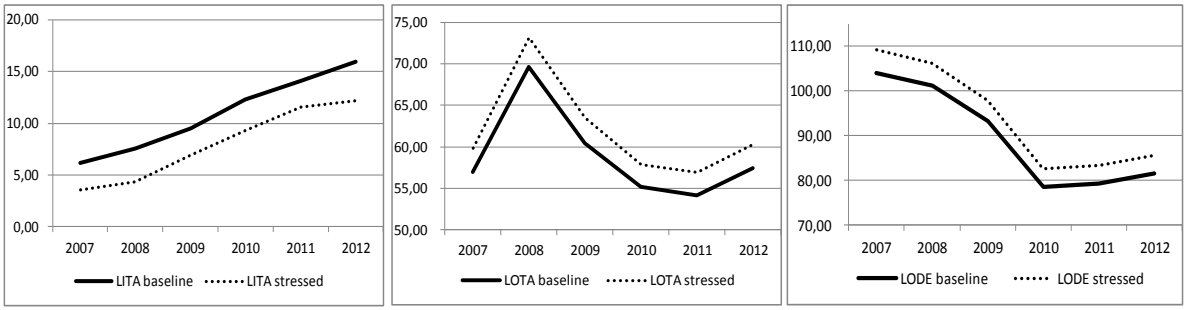

Fig. 1. (a) share of liquid assets in total assets (in %); (b) share of loans in total assets (in %); (c) share of loans in deposits (in %).

As it can be seen from Fig. 1, as a result of the use of loan commitments, bank liquidity would decrease in terms of all three ratios. A higher value of the share of liquid assets in total assets signals a better liquidity position of a bank. Lower stressed value of this ratio is therefore a signal of a liquidity outflow. Median values of the stressed share of liquid assets are positive for the whole analyzed period. This means that in spite of a substantial decrease of liquidity, Czech banks on average would be able to finance the use of loan commitments. Of course, individual banks could have problems (particularly LBBW Bank in 2007–2008 and 2011–2012, Raiffeisenbank in 2007 and Sberbank in 2007). As the stress value of this ratio is negative for these banks in these years, they would be not able to meet their obligations which could threaten not only their reputation but also their existence. Other banks would remain liquid.

Focusing on the share of loans in total assets, we should keep in mind that this is an indirect way of measuring bank liquidity. Therefore, the higher this ratio the less liquid the bank is. It is evident that the use of loan commitments would increase lending activity of banks and thus decrease their liquidity. As the stress values of this ratio are lower than 100 % for all banks, it means that at least theoretically all banks have capacity to increase their lending activity.

The last ratio – the share of loans to deposits – also documents decrease of liquidity as a result of the use of loan commitments. As this ratio measures also the dependence of banks on other sources of funding such as loans from the interbank markets or funds obtained by debt securities issuance, the median value of the stress value of the loan to deposit ratio shows that although the Czech banking sector as a whole is independent on other sources of funding in the last four years (with the exception of LBBW Bank, Raiffeisenbank and Sberbank for the whole period and Equa bank in 2009, Evropsko-ruská banka in 2009, GE Money Bank in 2011 and UniCredit Bank in 2011), after the use of 50 % of loan commitments, the above-mentioned banks would become more dependent on other source of funding.

4.2. Baseline and stress values of ratios by group of banks

In order to find out if the impact of the use of loan commitments differs by the size of the bank, we divided banks into three groups: small banks, medium banks and large banks. The criterion is the size of total assets. Following the methodology of Czech national bank (CNB, 2012), large banks are banks with total assets of more than CZK 250 billion, medium banks are banks with total assets of between CZK 50 billion and CZK 250 billion, and small banks are banks with total assets of less than CZK 50 billion. For each group of banks, we calculated average values of the baseline and the stress values of three ratios. The results can be found in Tables 3, 4 and 5.

Table 3. Average values of the share of liquid assets in total assets by group of Czech banks (in %).

	2007	2008	2009	2010	2011	2012
LITA for small banks baseline value	25.03	10.92	11.44	24.91	27.55	26.45
LITA for small banks stress value	21.69	8.50	8.70	22.53	25.11	23.66
LITA for medium banks baseline value	7.69	13.30	10.74	12.47	11.06	17.76
LITA for medium banks stress value	4.09	9.88	7.61	9.17	7.81	14.75
LITA for large banks baseline value	7.16	8.61	11.26	11.61	15.19	12.01
LITA for large banks baseline value	4.80	6.02	8.79	9.18	12.63	9.42

Table 3 shows significant differences in the level of liquidity in individual group of banks. Liquidity of small banks is substantially higher than liquidity of medium and large banks. Therefore even after the use of loan commitments, small banks are liquid enough. There is only one exception among small banks – LBBW Bank. This bank strongly focuses on lending activity; therefore a further increase in provided loans is not desirable for this bank. The link between bank liquidity and its lending activity is not so straightforward in case of medium and large banks. Some medium and large banks have an adequate level of liquid assets and in the same time, they are active in lending, while some others do not have enough liquid assets, although they did not provide many loans to nonbank customers.

Table 4. Average values of the share of loans in total assets by group of Czech banks (in %).

	2007	2008	2009	2010	2011	2012
LOTA for small banks baseline value	66.76	48.34	54.71	47.52	48.76	55.74
LOTA for small banks stress value	70.11	50.76	57.44	49.90	51.20	58.52
LOTA for medium banks baseline value	72.07	68.53	62.65	65.95	65.14	60.17
LOTA for medium banks stress value	75.67	71.95	65.78	69.25	68.40	63.18
LOTA for large banks baseline value	47.12	51.88	49.29	48.58	51.29	51.68
LOTA for large banks baseline value	49.48	54.48	51.76	51.01	53.86	54.27

As for the whole group of banks, medium banks are most active in providing loans to nonbank clients (Table 4). Also small banks lends quite strongly. Large banks are less willing to provide loans, particularly Československá

obchodní banka. As a result of the greater use of loan commitments, the stress value of the share of loans in total assets is not too high for any group of banks.

Table 5. Average values of the share of loans in deposits by group of Czech banks (in %).

	2007	2008	2009	2010	2011	2012
LODE for small banks baseline value	148.39	77.84	129.39	76.48	69.24	71.66
LODE for small banks stress value	155.81	81.70	135.70	80.30	72.71	75.24
LODE for medium banks baseline value	108.75	107.05	92.16	93.40	92.82	84.36
LODE for medium banks stress value	114.19	112.41	96.77	98.08	97.47	88.57
LODE for large banks baseline value	69.94	74.63	71.78	72.01	79.32	76.63
LODE for large banks baseline value	73.43	78.36	75.38	75.61	83.29	80.47

There exist significant differences in dependence of banks on other source of funding among individual group of banks (Table 5). Although large banks are able to finance their lending activity only from client's deposits, even after the application of the stress scenario of the use of loan commitments (with the only exception of UniCredit Bank in 2008–2011), small banks needs some other sources of funding in 2007 and 2009 and medium banks in 2007 and 2008.

The differences of the impact of the use of loan commitments on individual group of banks are really substantial. It is documented by values in Table 6.The average decrease of the share of liquid assets in total assets for all banks in the sample is decreasing in the analyzed period from 31 % in 2007 to 16 % in 2012. In the group of small banks, the liquid asset ratio declined much less. On the contrary, the fall of the share of liquid assets in total assets is slightly above average for large banks and substantially above average for medium banks.

Table 6. Average decrease of the share of liquid assets in total assets by group of banks (in %).

	2007	2008	2009	2010	2011	2012
Small banks	−13.34	−22.13	−23.91	−9.54	−8.85	−10.54
Medium banks	−46.86	−25.76	−29.17	−26.45	−29.44	−16.94
Large banks	−32.93	−30.12	−21.90	−20.93	−16.88	−21.52
All banks in the sample	−31.04	−26.00	−24.99	−18.97	−18.39	−16.33

Together with the low level of liquidity of medium banks before the application of the defined stress scenario (which is proved by low baseline values of this ratio), it is evident that medium banks are most vulnerable to the use of loan commitments. This finding is fully consistent with the sensitivity analysis of Slovak banks in 2005 (Jurča and Rychtárik, 2006). Among the group of medium banks, Sberbank and Raiffeisenbank are the most vulnerable banks (the decline of the liquid asset ratio for Sberbank is higher than 30 % in all years; for Raiffeisenbank, the decrease is even more than 60 % in most years). It is not surprising: the amount of clients' deposits in both banks is not sufficient for financing of their activities (the values of the baseline value of the share of loans in deposits are higher than 100 %). Therefore they need to use other sources of funding. These two banks also focus more on providing loans to non-bank customers; therefore they have a lower buffer of liquid assets.

5. Conclusion

The aim of this paper was to find out if Czech commercial banks are liquid enough to meet sold loan commitments and if there are any significant differences depending on the size of the bank.

We have used the scenario analysis for three liquidity ratios: share of liquid assets in total assets, share of loans in total assets and share of loans in deposits. We have calculated average and median values of baseline and stress types of these ratios. The results of the scenario analysis showed that in spite of a substantial decrease of liquidity (caused by the use of 50 % of loan commitments, modeled by a 5 % increase in lending activity), majority of Czech

banks would be able to finance such scenario. The exceptions are LBBW Bank in 2007–2008 and 2011–2012, Raiffeisenbank in 2007 and Sberbank in 2007. These banks do not have sufficient liquidity, which could threaten their reputation and the very existence.

At the same time, this stress scenario is not entirely appropriate for banks that are dependent on other source of funding: the use of loan commitments would deepen the dependence of these banks on funds obtained from the interbank market or by debt securities issuance. This is particularly the case of LBBW Bank, Raiffeisenbank and Sberbank in the whole analyzed period and Equa bank in 2009, Evropsko-ruská banka in 2009, GE Money Bank in 2011 and UniCredit Bank in 2011.

The analysis also showed significant differences in the level of liquidity in individual group of banks: small banks are much more liquid than medium and large banks (with the only exceptions of LBBW Bank among small banks). The use of loan commitments would influence each group of banks differently. The fall of the share of liquid assets in total assets is below average for small banks, slightly above average for large banks and substantially above average for medium banks. We have found that medium banks are most vulnerable to the use of loan commitments which is in accordance with findings of Jurča and Rychtárik (2006) for Slovak banking sector in 2005. Among the group of medium banks, Sberbank and Raiffeisenbank are the most vulnerable banks.

These results also showed us that liquidity is closely linked to profitability of banks. If banks prefer only to achieve maximum profitability, they provide relatively more loans to non-bank customers and they use more funds from the interbank market for financing of their activities (such as Sberbank, Raiffeisenbank and LBBW Bank). However, our analysis clearly proved that such banks are much more vulnerable in case of the crisis (which can be accompanied e.g. by a greater use of loan commitments).

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Appendix A. Effects of the use of loan commitments on the LITA ratio for all banks in the sample (in %)

	2007	2008	2009	2010	2011	2012
Česká spořitelna	−25.03	−20.24	−15.32	−11.17	−18.34	−20.46
Československá obchodní banka	−30.13	−23.55	−15.37	−22.99	−6.60	−8.76
Equa Bank	−5.32	−12.15	−14.15	−5.66	−6.39	−11.11
Evropsko-ruská banka			−23.25	−14.04	−13.38	−11.05
Fio banka				−4.68	−3.39	−3.30
GE Money Bank	−60.71	−52.11	−22.36	−16.32	−29.71	−19.36
J & T banka	−22.18	−20.17	−37.67	−40.35	−45.66	−22.37
Komerční banka	−38.93	−28.86	−22.44	−22.34	−19.63	−26.64
LBBW Bank	−146.13	−203.13	−88.51	−63.44	−118.36	−131.98
PPF banka	−22.40	−3.59	−12.36	−13.36	−8.86	−4.61
Raiffeisenbank	−118.14	−83.77	−61.56	−62.32	−66.33	−44.22
Sberbank	−109.76	−60.04	−34.75	−29.89	−34.66	−23.53
UniCredit Bank	−43.25	−76.30	−45.99	−60.49	−40.96	−87.42

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